

## Toll Bridge Travel Pattern Analysis

This analysis uses superdistrict-to-superdistrict vehicle trips (peak direction for 2 hours in a.m.) which cross the seven state-owned bridges to attempt to 1) assess who (by county of origin) is commuting across (paying the tolls) the bridges., 2) determine which corridors (bridge approaches) are most utilized to access the bridges, and 3) provide an indication of what may be the most effective types investments in new transit and other services to provide to meet travel demands.

Origin and destination vehicle trip tables (peak direction) and maps (peak and non-peak direction) for each of the bridges are attached. A summary of the travel patterns for the peak direction for each of the bridges is provided below.

### Benicia-Martinez Bridge (southbound)

- Users of the Benicia-Martinez Bridge (southbound direction) by county of trip origin include:

Solano	72.5%
Napa	4.7%
Marin/Sonoma	3.3%
Out of Region/Other	<u>19.5%</u>
	100%

- There are approximately 11,690 southbound vehicle trips on the Benicia-Martinez Bridge during the two-hour a.m. peak period, which is about 65% of total bridge trips during this time period.
- A large majority (66.3%) of the southbound trips crossing the Benicia-Martinez Bridge originate in Solano County with destinations in the central and eastern Contra Costa County. For trips using the Benicia Bridge, 42% originate in the Benicia/Vallejo area and 24.2% originate in the Fairfield/Vacaville area with destinations in the Concord and Walnut Creek areas.
- The Benicia-Martinez Bridge also has a significant number (19.5% of all southbound trips) of southbound trips, which originate from outside of the region. Most likely these trips are originating in the Davis/Sacramento areas. Most of these trips are also destined for the central and eastern Contra Costa County areas.
- A large number of trips across the Benicia-Martinez Bridge access the bridge through Interstate 80 to Interstate 680, using the I-80/680 Interchange.

## **Carquinez Bridge (southbound)**

- There are approximately 9,650 southbound vehicle trips on the Carquinez Bridge during the two-hour a.m. peak period, which is about 64% of total bridge trips during this time period.
- Users of the Carquinez Bridge (southbound direction) by county of trip origin include:

Solano	65.8%
Napa	10.0%
Marin/Sonoma	1.5%
Out of Region/Other	<u>22.4%</u>
	100%

- Most of the southbound trips crossing the Carquinez Bridge originate in Solano County with major destinations to west Contra Costa County, Berkeley, Oakland and San Francisco. Almost 32% of the trips crossing the Carquinez Bridge originating in Solano County have destinations in the Richmond/West Contra Costa County area. A significant number (66%) of the trips that cross the Carquinez Bridge travel the length of I-80 to/through the Bay Bridge approaches, connecting to Berkeley, Oakland, Southern Alameda County, and San Francisco.
- As with the Benicia-Martinez Bridge, the Carquinez Bridge also has a significant number (21.8% of all southbound trips) of southbound trips, which originate from outside of the region. Most likely these trips are originating in the Davis/Sacramento areas. Most of these trips are destined for the Oakland and San Francisco areas.

## **Richmond-San Rafael Bridge (eastbound)**

- During the a.m. 2-hour peak, eastbound and westbound vehicle trips are fairly evenly divided on the Richmond-San Rafael Bridge. There are approximately 4,400 (54%) eastbound vehicle trips and 3,770 (46%) westbound trips during this time period.
- Users of the Richmond-San Rafael Bridge (eastbound) by county of trip origin include:

Marin	70.2%
Sonoma	21.6%
Out of Region/Other	<u>8.2%</u>
	100%

- Most (54.2%) of the eastbound trips crossing the Richmond-San Rafael Bridge originate in Marin County with destinations to the Berkeley and Oakland areas.

As a result, these vehicle trips are mixing with the other I-80 trips in the Albany/Berkeley area.

### **Antioch Bridge (southbound)**

- There are approximately 844 southbound vehicle trips on the Carquinez Bridge during the two-hour a.m. peak period, which is about 64% of total bridge trips during this time period.

- Users of the Antioch Bridge by county of trip origin include:

Solano	22.9%
Out of Region/Other	<u>77.1%</u>
	100%

- Most Antioch Bridge users access their Bay Area destination by utilizing Route 4 in eastern Contra Costa County.

### **San Francisco-Oakland Bay Bridge (westbound)**

- Users of the San Francisco-Oakland Bay Bridge (a.m., westbound direction) by county of trip origin include:

Alameda	53.6%
Contra Costa	29.3%
Solano	8.9%
Napa	1.1%
Out of Region/Other	<u>7.1%</u>
	100%

- Approximately 30% of all bridge crossings during the a.m. 2-hour peak period are on the San Francisco-Oakland Bay Bridge. During the 2-hour peak period, westbound (16,610 – 52%) and east bound (15,460 – 48%) vehicle trips are rather evenly divided. However, as longer periods of time during the morning travel period are examined westbound trips become increasingly more of the total.
- Twenty-seven percent (27%) of the total trips across the Bay Bridge originate in the Oakland area (Superdistrict 18).
- In terms of vehicle trips, the Interstate 80 corridor is the most heavily utilized corridor leading to the Bay Bridge, followed by the I-880, I-580, and Route 24 Corridors respectively.

### **San Mateo-Hayward Bridge (westbound)**

- There are approximately 7,600 westbound vehicle trips on the San Mateo-Hayward Bridge during the two-hour a.m. peak period, which is about 57% of total bridge trips during this time period.
- Users of the San Mateo-Hayward Bridge (westbound) by county of trip origin include:

Alameda	84.6%
Contra Costa	8.2%
Solano, Marin and Sonoma	0.8%
Out of Region/Other	<u>6.4%</u>
	100%

- The majority (61.3%) of vehicle trips on the San Mateo-Hayward Bridge originate in the San Leandro/Hayward/Fremont areas.
- Approximately 8.0% of vehicle trips on the bridge originate in central and eastern Contra Costa County and about 6.5% originate in eastern Alameda County.
- Of the total trips crossing the San Mateo-Hayward Bridge approximately 60% head in a northern direction on 101, while the remainder head south on 101.

### **Dumbarton Bridge (westbound)**

- There are approximately 6,150 westbound vehicle trips on the Dumbarton Bridge during the two-hour a.m. peak period, which is about 68% of total bridge trips during this time period.
- Users of the Dumbarton Bridge by county of trip origin include:

Alameda	78%
Contra Costa	3.9%
Solano, Marin and Sonoma	2.1%
Out of Region/Other	<u>3.5%</u>
	100%

- The large majority (63.3%) of vehicle trips on the Dumbarton Bridge originate in the San Leandro/Hayward/Fremont areas, with most coming from the Fremont area (Superdistrict 16).
- Almost all of the trips across the Dumbarton Bridge in the westbound direction have destinations in the San Mateo, Menlo Park and Palo Alto areas.

## Summary of Peak Direction Trips by Super District Groupings

### Travel Patterns San Francisco Oakland Bay Bridge - Westbound

Origin		Destination		AM Vehicle Trips (2 Hour)	% of Total
Superdistrict	Area	Superdistrict	Area		
15	Livermore/Pleasanton	1,2,3,4,5	San Francisco/Daly City	574	3.5%
16	Fremont	1,2,3,4,5	San Francisco/Daly City	526	3.2%
17	San Leandro/Hayward	1,2,3,4,5	San Francisco/Daly City	1272	7.7%
18	Oakland	1,2,3,4,5,6	San Francisco/Daly City/San Mateo	4487	27.0%
19	Berkeley/Albany	1,2,3,4,5	San Francisco/Daly City	2021	12.2%
20	Richmond/West Contra Costa	1,2,3,4,5,6	San Francisco/Daly City/San Mateo	1791	10.8%
21	Concord/Pleasant Hill	1,2,3,4,5,6	San Francisco/Daly City/San Mateo	1112	6.7%
22	Walnut Creek	1,2,3,4,5,6	San Francisco/Daly City/San Mateo	1125	6.8%
23	Danville/San Ramon	1,2,3,4,5,6	San Francisco/Daly City/San Mateo	589	3.5%
24	Antioch	1,2,3,4,5,6	San Francisco/Daly City/San Mateo	257	1.5%
25	Vallejo/Benicia	1,2,3,4,5,6	San Francisco/Daly City/San Mateo	901	5.4%
26	Fairfield/Vacaville	1,2,3,4,5,6	San Francisco/Daly City/San Mateo	579	3.5%
27	Napa	1,2,3,4,5,6	San Francisco/Daly City/San Mateo	113	0.7%
28	Upper Napa Valley	1,2,3,4,5	San Francisco/Daly City	59	0.4%
29, 32, 33	Marin & Sonoma	1,2,3,4,5	San Francisco/Daly City	7	0.0%
35	Out of Region	1,2,3,4,5,6	San Francisco/Daly City/San Mateo	1193	7.2%
				16606	100.0%

**Travel Patterns**  
**Carquinez Bridge - Southbound**

Origin		Destination		AM Vehicle Trips (2 Hour)	% of Total
Superdistrict	Area	Superdistrict	Area		
25	Vallejo/Benicia	1,2,3,4,5,	San Francisco/Daly City	1087	11.3%
25	Vallejo/Benicia	6,7,8,	San Mateo/Redwood City/Palo Alto	47	0.5%
25	Vallejo/Benicia	17,16	San Leandro/Fremont	140	1.5%
25	Vallejo/Benicia	20	Richmond	1134	11.8%
25	Vallejo/Benicia	19,18	Berkeley/Oakland	1127	11.7%
25	Vallejo/Benicia	21,22	Concord/Walnut Creek	54	0.6%
25	Vallejo/Benicia	32,33,34	Marin County	277	2.9%
26	Fairfield/Vacaville	1,2,3,4,5,	San Francisco/Daly City	719	7.5%
26	Fairfield/Vacaville	6,7,8,	San Mateo/Redwood City/Palo Alto	58	0.6%
26	Fairfield/Vacaville	17,16	San Leandro/Fremont	62	0.6%
26	Fairfield/Vacaville	20	Richmond	884	9.2%
26	Fairfield/Vacaville	19,18	Berkeley/Oakland	647	6.7%
26	Fairfield/Vacaville	32,33,34	Marin County	152	1.6%
27, 28	Napa County	1,2,3,4,5,	San Francisco/Daly City/San Mateo	170	1.8%
27, 28	Napa County	6,7,8,	San Mateo/Redwood City/Palo Alto	51	0.5%
27, 28	Napa County	17,16	San Leandro/Fremont	55	0.6%
27, 28	Napa County	20	Richmond/Berkeley/Oakland	687	7.1%
29, 30,32,33,34	Marin & Sonoma Counties	19,18	Richmond/Berkeley/Oakland	37	0.4%
29, 30,32,33,34	Marin & Sonoma Counties	21,22	Concord/Walnut Creek	104	1.1%
	Other		Other	50	0.5%
35	Out of Region/Other		In Region	2108	21.8%
				9650	100.0%

**Travel Patterns**  
**Benicia-Martinez Bridge - Southbound**

Origin		Destination		AM Vehicle Trips (2 Hour)	% of Total
Superdistrict	Area	Superdistrict	Area		
25	Vallejo/Benicia	6,7,8	San Mateo/Redwood City/Palo Alto	15	0.1%
25	Vallejo/Benicia	9,10,11,12,13	Santa Clara County	106	0.9%
25	Vallejo/Benicia	19,20	Berkeley/Oakland	130	1.1%
25	Vallejo/Benicia	21,22,23,24	Concord/Walnut Creek/Danville/Antioch	4922	42.1%
25	Vallejo/Benicia	15	Livermore/Pleasanton	160	1.4%
26	Fairfield/Vacaville	6,7,8,9,10,11,12,13	San Mateo/Santa Clara Counties	129	1.1%
26	Fairfield/Vacaville	15	Livermore/Pleasanton	132	1.1%
26	Fairfield/Vacaville	19,20	Berkeley/Oakland	50	0.4%
26	Fairfield/Vacaville	21,22,23,24	Concord/Walnut Creek/Danville/Antioch	2828	24.2%
27, 28	Napa County	21,22,23,24	Concord/Walnut Creek/Danville/Antioch	549	4.7%
29, 30,32,33,34	Marin & Sonoma Counties	21,22,23,24	Concord/Walnut Creek/Danville/Antioch	386	3.3%
35	Out of Region/Other		In Region	2284	19.5%
				11691	100.0%

**Travel Patterns**  
**San Mateo-Hayward Bridge - Westbound**

Origin		Destination		AM Vehicle Trips (2 Hour)	% of Total
Superdistrict	Area	Superdistrict	Area		
15	Livermore/Pleasanton	5,6,7	Daly City/San Mateo/Menlo Park	487	6.4%
16,17	San Leandro/Hayward/Fremont	2,3,4,5	San Francisco/Daly City	1505	19.8%
16,17	San Leandro/Hayward/Fremont	6,7	San Mateo/Menlo Park	3156	41.5%
18, 19, 20	Oakland, Berkeley, Richmond	5,6,7	Daly City/San Mateo/Menlo Park	1288	16.9%
21, 22, 23, 24	Concord/Walnut Creek/Danville/Antioch	5,6,7	Daly City/San Mateo/Menlo Park	622	8.2%
25, 30, 32, 33	Solano, Marin & Sonoma Counties	6,7	San Mateo/Menlo Park	62	0.8%
35	Out of Region/Other		In Region	484	6.4%
				7604	100.0%



**Travel Patterns  
Dumbarton Bridge - Westbound**

Origin		Destination		AM Vehicle Trips (2 Hour)	% of Total
Superdistrict	Area	Superdistrict	Area		
15	Livermore/Pleasanton	5,6,7	Daly City/San Mateo/Menlo Park	350	5.7%
16,17	San Leandro/Hayward/Fremont	2,3,4,5	San Francisco/Daly City	552	9.0%
16,17	San Leandro/Hayward/Fremont	6,7	San Mateo/Menlo Park	3896	63.3%
18, 19, 20	Oakland, Berkeley, Richmond	5,6,7	Daly City/San Mateo/Menlo Park	769	12.5%
21, 22, 23, 24	Concord/Walnut Creek/Danville/Antioch	5,6,7	Daly City/San Mateo/Menlo Park	239	3.9%
25, 30, 32, 33	Solano, Marin & Sonoma Counties	6,7	San Mateo/Menlo Park	127	2.1%
35	Out of Region/Other		In Region	218	3.5%
				6151	100.0%

**Travel Patterns  
Antioch Bridge - Southbound**

Origin		Destination		AM Vehicle Trips (2 Hour)	% of Total
Superdistrict	Area	Superdistrict	Area		
26	Fairfield/Vacaville	1,2,3,4,5	San Francisco/Daly City	13	1.1%
26	Fairfield/Vacaville	9,10,11,12,13,14	Santa Clara County	6	0.5%
26	Fairfield/Vacaville	21,22,23,24	Concord/Walnut Creek/Danville/Antioch	130	10.6%
26	Fairfield/Vacaville	15	Livermore/Pleasanton	6	0.5%
26	Fairfield/Vacaville	18,19	Berkeley/Oakland	29	2.4%
26	Fairfield/Vacaville		Out of Region	102	8.3%
35	Out of Region	1,2,3,4,5	San Francisco/Daly City/San Mateo	203	16.5%
35	Out of Region	9,10,11,12,13,14	Santa Clara County	185	15.1%
35	Out of Region	21,22,23,24	Concord/Walnut Creek/Danville/Antioch	169	13.8%
35	Out of Region	15	Livermore/Pleasanton	49	4.0%
35	Out of Region	18,19	Berkeley/Oakland	193	15.7%
35	Other		Other	143	11.6%
				1228	100.0%

**Travel Patterns**  
**Richmond-San Rafael Bridge - Eastbound**

Origin		Destination		AM Vehicle Trips (2 Hour)	% of Total
Superdistrict	Area	Superdistrict	Area		
29,30,31	Sonoma County	6,7,8,9,10,11,12,13,14	San Mateo/Santa Clara County	120	2.7%
29,30,31	Sonoma County	16,17,18,19	Berkeley/Oakland/Hayward/Fremont	636	14.5%
29,30,31	Sonoma County	20	Richmond/West Contra Costa	195	4.4%
32, 33, 34	Marin County	6,7,8,9,10,11,12,13,14	San Mateo/Santa Clara County	203	4.6%
32, 33, 34	Marin County	16,17,18,19	Berkeley/Oakland/Hayward/Fremont	1745	39.7%
32, 33, 34	Marin County	20	Richmond/West Contra Costa	812	18.5%
32, 33, 34	Marin County	21,22,23,24	Concord/Walnut Creek/Danville/Antioch	328	7.5%
35	Out of Region/Other		In Region/Other	361	8.2%
				4400	100.0%